REMARKS

Claims 9-11 and 14 are withdrawn as directed to non-elected subject matter. Claims 1-8 and 12-13 have been amended. Claims 2-6 and 12-13 have been amended for clarity by replacing "characterized in that" with "wherein". Similarly, claims 7 and 8 have been amended to replace "characterized in that" with "further including". Claim 1 has been amended to specify that the impregnation composition contains at least one metal phosphate in solution together with titanium diboride in powder form, and to more explicitly recite the steps of providing an impregnation composition and impregnating the part with the composition. Support for the amendment is found, for example, in the specification at page 2, line 34, through page 3, line 2, and at page 3, lines 21-22. No new matter has been added.

Restriction Requirement

The Examiner has divided the claims into Group I, claims 1-8 and 12-13, directed to a method of protecting a part, and Group II, claims 9-11 and 14, directed to a composite metal part containing carbon. A telephone election was made with traverse on October 29, 2009 to prosecute Group I, claims 1-8. That election is hereby affirmed.

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The election is made with traverse, and reconsideration is requested because the search and consideration of all the claims would not impose an undue burden on the Examiner. Furthermore, the Examiner states that the claims of Groups I and II do not share a common special technical feature, since de Nora et al., U.S. Patent 6,228,424 teaches using TiB_2 in a coating to prevent oxidation. Rejoinder is consistent with PCT practice and further in response, however, Applicants note that de Nora does not disclose the use of an impregnation solution containing both a metal phosphate in solution and titanium diboride in powder form, as required by the present claims. Thus, the claims of Groups I and II do share a common special technical feature.

Rejection Under 35 U.S.C. §102(b)

Claims 1-5, 7-8, and 12 are rejected as allegedly anticipated by Morel at al., U.S. 5,420,084. The rejection is respectfully traversed.

Morel is cited for teaching the use of zirconium diboride as interchangeable with titanium diboride in a coating composition for protecting carbon-containing materials from oxidation at high temperatures. Further, Morel is cited as teaching the additional use of zinc phosphate or aluminum phosphate in the coating

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composition. The Office Action also uses Morel's reference to the prior art use of "phosphates or borates" as oxidation inhibitors to suggest that "[p]resumably, it is fine to use both."

Applicants' maintain that Morel does not disclose using a composition according to the present claims, in which a metal phosphate in solution is used together with titanium diboride in powder form, as a single impregnation composition. Morel indicates that a composition comprising titanium diboride and a silica compound was known (Morel at col. 1, lines 59-61) but was not efficient (col. 2, lines 56-59). Morel teaches away from using titanium diboride in favor of using zirconium boride, as further discussed below. And, importantly, Morel teaches using zinc phosphate or aluminum phosphate in a separate layer from zirconium boride, never in the same layer or in the same coating composition.

The invention disclosed by Morel uses zirconium diboride together with colloidal silica (see Morel at col. 2, lines 53-55 and in particular col. 4, lines 7-10) to form a protective coating on a substrate. Morel states repeatedly that titanium diboride should not be used (col. 2, lines 66-68 and col. 3, lines 16-18).

Morel discloses the use of zinc phosphate or aluminum phosphate as an optional step, to form an adhesive underlayer on

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the substrate before forming the protective coating containing zirconium diboride and colloidal silica (see col. 2, lines 6-21, Example 3, and claims 9-10). Thus, there is no teaching or suggestion in Morel of a protective coating containing both a metal phosphate and a diboride, much less titanium diboride. The phosphate underlayer of Morel is disclosed only in combination with a separate protective coating containing zirconium diboride and colloidal silica.

There is no disclosure or even a suggestion in Morel of a protective coating formed from a composition containing a metal phosphate in solution together with titanium diboride in powder form. Hence, claims 1-5, 7-8, and 12 are novel over Morel. The withdrawal of the rejection is respectfully requested.

Rejection Under 35 U.S.C. §103(a)

Claims 6 and 13 are rejected as allegedly obvious over Morel in view of Dwivedi et al., U.S. 5,526,914, as evidenced by Chapman et al., U.S. 4,711,666. The rejection is respectfully traversed.

Compared to the previously considered group of claims, claims 6 and 13 also recite that "the impregnation composition contains, in percentage by weight, 20% to 70% metal phosphate(s), 5% to 50% titanium diboride, 20% to 50% water, and 0% to 40% refractory

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solid filler other than titanium diboride". The Office Action acknowledges that Morel does not teach the weight percentage of water in such a composition and uses Dwivedi for its alleged disclosure of this feature.

The teachings of Morel and their applicability to the claims are discussed above. Applicants again note that Morel fails to teach or even suggest application of a protective coating formed from a composition containing a metal phosphate in solution together with titanium diboride in powder form. Dwivedi relates to the formation of a metal matrix composite useful for making brake rotors or clutch plates. However, Dwivedi does not disclose or suggest a composition containing a metal phosphate in solution together with titanium diboride in powder form, and Dwivedi does not cure the defects of Morel. Therefore, the claims are not obvious over Morel in view of Dwivedi.

A major part of the Dwivedi disclosure relates to the prior art. Dwivedi's method for making a part made of metal matrix composite consists in providing a filler material forming a preform and in infiltrating molten metal or alloy within the filler material. There is a need to avoid the infiltrated molten metal or alloy being present beyond the boundaries defined by the filler material in order to obtain a part having a desired shape

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corresponding to the shape of the filler material. This is achieved by providing the filler material with a barrier forcing the molten metal or alloy to remain within the boundaries defined by the filler material. Reference is made to the following passages of Dwivedi in particular: col. 5, line 60 to col. 6, line 4; col. 6, lines 43-45; col. 10, lines 6-9; col. 10, lines 33-37; and col. 14, lines 51-57. From col. 6, lines 2-4 and col. 15, lines 2-5, it is clear that the barrier acts like a Shell or a "mold" member which does not remain at the surface of the metal matrix composite body after infiltration with a molten metal or alloy since the outer shape of the metal matrix composite body is defined by the inner shape of the barrier.

The barrier disclosed by Dwivedi has nothing to do with a protective coating formed on a part to protect the part against oxidation when in use. This is confirmed by the fact that the barrier may be made purposely permeable or porous to allow an oxidant to contact the infiltrated metal or alloy (col. 15, lines 5-8 and 15-16). There are indeed instances where a reaction between the molten metal and an oxidant is desired (col. 10, lines 58-63). The passage quoted by the Examiner at col. 10, lines 29-30 (which start on line 27) relates to the use of aluminum phosphate or colloidal silica to form a barrier in the sense

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stated above, namely a shell or "mold" useful only during making of the metal matrix composite body. There is absolutely no disclosure in Dwivedi et al. of the possible use of aluminum phosphate or colloidal silica to form a protective coating against oxidation.

The improvement described by Dwivedi et al. consists in providing a metal matrix composite body with a coating which makes it possible to reach a higher maximum operative temperature (col. 1, lines 20-25). Such a coating forms a physical or thermal protective barrier (col. 23, lines 44-51) which has nothing to do with the barrier used during manufacture of the body. There is hardly any disclosure of the composition of the protective coating, except a preceramic polymer (claim 1) or an anodized layer (Col. 26, l. 40-41).

In summary, none of the claims (i.e., none of claims 1-8 and 12-13) is obvious over Morel in view of Dwivedi because the references, either singly or combined, fail to teach or suggest every element of the claims. Morel clearly teaches away from using titanium diboride for a protective coating against oxidation, and fails to teach or suggest a composition containing both titanium diboride powder and a metal phosphate in solution. Dwivedi discloses aluminum phosphate and colloidal silica as

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possible material for forming a shell encasing a filler material preform upon infiltrating with a molten metal or alloy, but not as a possible material for a protective coating against oxidation.

The withdrawal of the rejection is respectfully requested.

The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

PASCAL DISS ET AL.

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